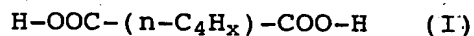


We claim

1. A process for the preparation of a dicarboxylic acid of the formula (I)



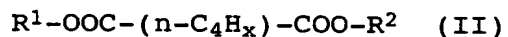
where

x is 6 or 8,

starting from acrylic acid,

which comprises

- a) reacting a dicarboxylic acid diester of the formula (II)



where

x is 6 or 8, and

R^1 and R^2 , independently of one another, are C_1 -, C_2 -, C_3 - or C_4 -alkyl, aryl or heteroaryl and may be identical to or different from one another,

with acrylic acid to give a dicarboxylic acid of the formula (I) and a mixture of acrylic acid esters of the formulae $\text{C}_2\text{H}_3\text{-COOR}^1$ and $\text{C}_2\text{H}_3\text{-COOR}^2$, where R^1 and R^2 are as defined above,

- b) separating the dicarboxylic acid of the formula (I) obtained in step a) from the reaction mixture obtained in step a),
- c) dimerizing the $\text{C}_2\text{H}_3\text{-COOR}^1$, $\text{C}_2\text{H}_3\text{-COOR}^2$ or mixture thereof obtained in step a) to give an n-butenedicarboxylic acid diester, and
- d) cleaving the dicarboxylic acid diester obtained in step c) to give the corresponding dicarboxylic acid of the formula (I).

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2. A process as claimed in claim 1, where the cleavage of the n-butenedicarboxylic acid diester in step d) is carried out by

5 recycling the n-butenedicarboxylic acid ester obtained in step c) into step a),

converting this n-butenedicarboxylic acid diester into n-butenedicarboxylic acid in step a), and

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obtaining n-butenedicarboxylic acid as the dicarboxylic acid of the formula (I) in step b).

3. A process as claimed in claim 1, where the
15 n-butenedicarboxylic acid obtained in step d) is hydrogenated to give adipic acid as the dicarboxylic acid of the formula (I).

4. A process as claimed in claim 1, where the cleavage of the
20 n-butenedicarboxylic acid diester in step d) is carried out by

recycling the n-butenedicarboxylic acid ester obtained in step c) into step a),

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converting this n-butenedicarboxylic acid diester into n-butenedicarboxylic acid in step a),

obtaining n-butenedicarboxylic acid in step b), and

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hydrogenating this n-butenedicarboxylic acid to give adipic acid as the dicarboxylic acid of the formula (I).

5. A process as claimed in claim 1, where

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the n-butenedicarboxylic acid diester obtained in step c) is hydrogenated between steps c) and d) to give an adipic acid diester, and

40 adipic acid is obtained as the dicarboxylic acid of the formula (I) by cleaving the adipic acid diester in step d).

6. A process as claimed in claim 1, where

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the n-butenedicarboxylic acid diester obtained in step c) is hydrogenated between steps c) and d) to give an adipic acid diester,

5 the cleavage of the adipic acid diester in step d) is carried out by recycling the resultant adipic acid diester into step a) and converting it into adipic acid in step a), and

10 adipic acid is obtained as the dicarboxylic acid of the formula (I) in step b).

7. A process as claimed in any one of claims 1 to 6, where the radicals R^1 and R^2 are, independently of one another, methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, s-butyl or
15 t-butyl.

8. A process as claimed in any one of claims 1 to 7, where the radicals R^1 and R^2 are identical.

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